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Floriculture Sustainability Research Coalition: Bringing the Latest Sustainability Research to the Industry

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Consumer interest in environmentally friendly products has increased greenhouse growers' interest in sustainable production techniques. It is estimated that consumers would spend up to 15% more for sustainable floricultural products than conventionally produced products, and purchasers of herbaceous or floricultural plant products tend to be more eco-friendly than those who purchase woody plant materials (Behe et al., 2010; Hawkins et al., 2011). In 2008, the Floriculture Sustainability Research Coalition (FSRC) was formed to provide information regarding sustainable production techniques for growers. Forming a coalition has allowed the group to broaden our expertise to have a more meaningful impact on growers' production practices.

The FSRC began in 2008 at the National Floriculture Forum. Founding institutions include Purdue University, University of New Hampshire, Cornell University, and University of Maine. Our core purpose is to develop central sustainability themes for outreach and research programs that synergistically build on individual strengths to increase knowledge and create outreach materials that benefit our audience. Alone, it is difficult to have much of an impact on such a large topic. But, as a group, we could potentially have more impact—not only topically, but also regionally. Cornell University examines sustainable and organic fertilizer use and energy conservation, Purdue University provides expertise in sustainable lighting and energy conservation, University of New Hampshire specializes in nonchemical growth regulation and sustainable fertilizer use, and at University of Maine, research focuses on water conservation and organic substrates and fertilizers.

Over the past 3 years, the FSRC has provided research-based information to help growers produce floricultural crops more sustainably. Recent initiatives have included exploring techniques for sustainably heating greenhouses, reducing plant stretch without the use of chemical growth retardants, and developing protocols for using organic fertilizers.

Conserving energy is a priority for greenhouse growers throughout the United States. A survey of greenhouse growers indicates that 55% of growers are currently using energy conservation practices; an additional 8% would like to conserve energy (Dennis et al., 2010). Our group has published several articles on novel techniques to reduce energy. For example, Lopez and Krug (2009) reported that growing medium-vigor poinsettia (*Euphorbia pulcherrima*) cultivars at a temperature 10 °F less than recommended (75/67 °F day/night) does not reduce crop quality for some cultivars, including 'Freedom Red'. But, this reduction in temperature set points in the fall would reduce fuel usage for greenhouse growers. At Cornell, bedding plants including 'Safari Orange' marigold (*Tagetes patula*), 'Delta Formula Mix' pansy (*Viola ×wittrockiana*), 'Dreams Midnight' petunia (*Petunia ×hybrida*), 'Montego Mix' snapdragon (*Antirrhinum majus*), and 'Dreamland Mix' zinnia (*Zinnia elegans*) were grown in an unheated high tunnel. Compared with the heated greenhouse environment, temperatures in the high tunnel were 5 °F cooler (Table 1). Pansy plants did not finish significantly later in the high tunnel compared with the greenhouse; the other plants finished about 1 week later in the high tunnel. Part of our efforts in this area has focused on extension and outreach to support growers who are transitioning to more sustainable heating technologies. In trade publications, we have highlighted innovative growers who may inspire others by example (Burnett et al., 2010). Currently, Purdue University, in collaboration with Michigan State University, University of Arizona, and Rutgers University, is working on a U.S. Department of Agriculture (USDA) Specialty Crops Research Initiative grant to develop light-emitting diodes as supplemental and photoperiodic lighting for greenhouses.

Another highlight of our work with sustainable production has focused on finding alternatives to chemical growth retardants. Our approach to reducing plant stretch without chemical growth retardants has been to recommend that growers adjust the greenhouse or plant environment. R. Lopez and B. Krug have represented our group to growers nationally and regionally. Some techniques we have successfully used include reducing water to reduce turgor in a controlled manner. Using new moisture sensors, plants may be grown in substrates that are maintained at constant moisture contents. So, they may be grown in relatively dry substrates (volumetric water content = 15% to 25% in a peatlite mix) without risking plant damage. This may reduce plant height, but controlled drought also reduces branching (Burnett and van Iersel, 2008). One straightforward way to reduce elongation is simply to grow plants at the appropriate light level. This will reduce plant stretch by minimizing shading, particularly from neighboring plants.

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Units

To convert U.S. to SI, multiply by	U.S. unit	SI unit	To convert SI to U.S., multiply by
(°F – 32) ÷ 1.8	°F	°C	(1.8 × °C) + 32